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Head in a Cloud: An approach for Arduino YUN virtualization

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Abstract

© 2017 IEEE. Smart boards are triggering the IoT revolution, allowing to make common objects and things smart through their network, storage and processing capabilities. Arduino boards have a prominent role in this revolution, due to their customizability and programming freedom. From a different perspective, another strategic development for the IoT is towards Cloud, allowing to properly manage things and data ubiquitously, on demand, as services. Pushing in this direction, we can pave the way to the Cloud of Things, where real things, rather than the data they produce, can be provided to third parties, by adopting a 'device-centric' approach. To this purpose, virtualization of physical resources becomes an essential step and core mechanism. In this paper we focus on smart board virtualization, implementing a flexible solution for Arduino boards based on Stack4Things, allowing to create, multiplex, migrate and deploy virtual boards in IoT-Cloud contexts. The results obtained by a preliminary implementation and experiments on the #SmartME testbed are shown in the paper to demonstrate the feasibility and the effectiveness of the proposed solution.

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Keywords

Arduino YUN, Cloud, GPIO pins, IoT, Linux Containers, Stack4Things, Virtualization

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